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ON A NEW SPECIES OF RHABDITOID WORMS FOUND IN THE HUMAN INTESTINES

HARUJIRO KOBAYASHI

Most species of Rhabditis and its allies are found free living in the earth and decayed vegetable matter. Several examples of parasitic Rhabditis, however, have been reported, e. g., *Rhabditis pellio* (Scheiber) in the urine (Scheiber 1880, Baginsky 1887), *Rhabditis* niellyi (Blanchard) in the skin (Nielly 1882), *Rhabditis* sp. in the stomach (Frese 1907) and others. Such were also found parasitic in certain other species of mammals. They may be true parasites, but most of them seem rather to be facultative parasites.

In 1914, when I was engaged in the microscopical examination of the feces of the pupils of a primary school in Ibaraki Prefecture, Japan, for the eggs of parasites, I found several times in the fresh feces worms belonging to a certain species of Rhabditis. It seemed to be new to science and to it I gave the name *Rhabditis hominis* n. sp.; it is this with which I am going to deal in the present communication.

Rhabditis hominis is viviparous and found numerously in the freshly passed feces (strict precautions were taken to exclude free living nematodes). All the stages of its development occurred in the same specimen of feces, i. e., the adults and young of both males and females and the newly hatched larvae.

A full grown female measures 1.5 to 2 mm. in length and 0.12 mm. in breadth. In the cuticula fine transverse striations are seen. The body has a cylindrical shape of nearly uniform diameter, altho it tapers gradually anteriorly from the part of the esophagus. Posteriorly, the body narrows more abruptly at the region of the anus and becomes a long and fine tip. The tail (from the level of the anus to the end) measures 0.17 to 0.24 mm. in length. The oral orifice is surrounded by four labial palpi, and leads to the oral cavity consisting of a relatively long canal, measuring 0.02 to 0.04 mm. in length. The muscular esophagus has a length of 0.17 to 0.2 mm. It consists of four parts: (1) a relatively long and broad anterior canal; (2) the anterior bulbus; (3) a narrower posterior canal, and (4) the posterior bulbus. The anterior bulbus lies at the middle of the whole length of the esophagus and the oral cavity. The anterior canal region is slightly shorter than the posterior one. The posterior bulbus is 0.02 mm. in diameter and smaller than the anterior. The internal lumen

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of the esophagus gradually narrows posteriorly. The broadest part of it at the anterior end of the anterior canal is 6μ in width, being the same as that of the oral cavity, while its posterior half is apparently closed. It again widens slightly in the anterior bulbus and in the posterior canal region it again closes. The intestine consists of two rows of cells. The two ends of the intestine are thicker than the middle, which occupies the largest part and is compressed by the genital organs. Near the posterior end the intestine narrows abruptly and is connected to the rectum. The excretory canal opens at the level of the posterior bulb of the esophagus.

The worm has a vulva, which opens at about the middle of the body, and paired ovaries and uteri. The ovaries consist of club-shaped rows of cells. The anterior ovary arises slightly anterior to the anus and runs anteriad. Just in front of the middle of the body (or near the posterior end of the esophagus) it narrows and is connected with the uterus. The uterus runs farther anteriad and near the posterior bulb of the esophagus turns posteriad to join the vulva. The posterior ovary arises slightly posterior to the esophagus (almost at the same level as the bend of the anterior uterus) and is continued posteriorly to the uterus, which runs further posteriad. Before it reaches the posterior end of the intestine, it turns anteriad and ends in the vulva. In somewhat younger specimens, the turning point of the posterior uterus and the anus are about 0.16 mm. apart. In the young specimens, each uterus is filled with 10 to 50 eggs, the larger specimens carrying more than the smaller. The posterior uterus is somewhat shorter than the anterior, if not the same length. The uteri of a full grown worm are filled witth hatched embryos. The eggs in the uteri are somewhat irregularly ellipsoidal and measure 44 to 28 by 28 to 32μ.

Full grown males measure 0.9 to 1.2 mm. in length and 0.03 to 0.05 mm. in breadth. They are similar in form to the females. The posterior part narrows abruptly at the region of the bursa copulatrix and forms the tail which curves somewhat laterad. The anus and the posterior end of the body stand 0.064 to 0.07 mm. apart. The tail is 28μ long. The alimentary canal is similar in structure to that of the female, but the esophagus of the male is shorter and smaller than that of the female, measuring 0.13 to 0.14 mm. in length. The male has one testis, which arises directly posterior to the esophagus and runs posteriad, forming the vesicula seminalis. It has two spicules of the same size, 35 to 41μ long. The terminal part of each spicule curves exteriorly and ventrally, and has the shape of a sickle. Dorsally to the spicules, a rod-shaped gubernaculum is present.

A bursa copulatrix is present. The anterior end of this organ lies at about the same level as the anterior end of the spicules and the posterior end reaches to the place where the body narrows abruptly. It is narrow and is provided with six pairs of stalked papillae; two of them are preanal, while the third pair lies almost at the same level as the anus. The first and the second pairs, and the third and the fourth pairs lie closer together than the second to the third, and the fourth to the fifth pairs. The fifth and the sixth pairs lie closest together of all.

The youngest larvae measure 0.24 to 0.3 mm. long by 0.012 to 0.03 mm. wide. They have an esophagus, which is relatively long, occupying about one third of the entire body length; it contains two bulbi. The oral cavity can be clearly recognized.

The worms were found parasitic in the pupils of the primary schools in the counties of Soma and Inashiki. Seventeen cases out of 668 examined (i. e., 2.5 per cent.) were infected. All the cases were boys and girls between 10 and 14. The examination was carried out during October and November. The worms were found in considerable numbers. Furthermore, Dr. O. Takaki found 3 cases out of 471 pupiles examined in the primary schools of the county of Kitasoma. His examination was made in June, 1914.

It is interesting to note that four pupils out of the seventeen who had been proved to harbor the worms by fecal examination in October and November, 1913, were all found free from the worm on their re-examination in January, 1914. In other words, the worms had entirely passed out of the body without any medical treatment in the course of two to three months. This fact shows that the worm may not be a true parasite, but happened to find a temporary or accidental lodgment in the human body. Still it seems to be highly probable that the worms can thrive in the human alimentary canal, for they were found abundantly and in all the stages of their development. The parasitologic importance of the species is to be studied in the future.

This nematode occurs in the larval and adult forms in the human feces, but no eggs are found in the feces, and therefore it should never be mistaken for *Strongyloides stercoralis* Bavay. Several Japanese articles regarding the discovery of *Strongyloides stercoralis* that were published some time back seem to have been dealing with this worm, especially those of Iwaya, Hasegawa and Chikada, and Shiga (see Japanese references below).

Dr. Takaki reports that these nematodes seem to have no pathogenicity towards their hosts, for the latter endure the presence of innumerable worms without the least sign of ill health.

Fig. 4

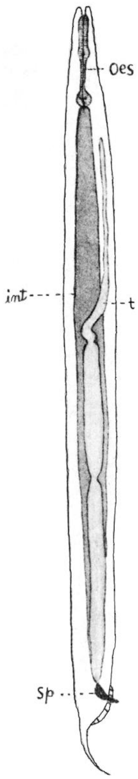


Fig. 1

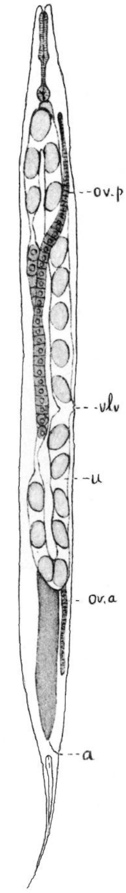


Fig. 2

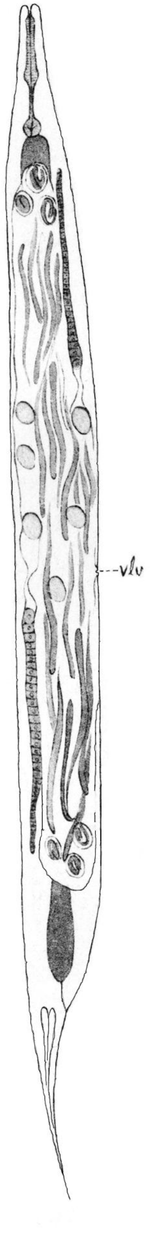


Fig. 3

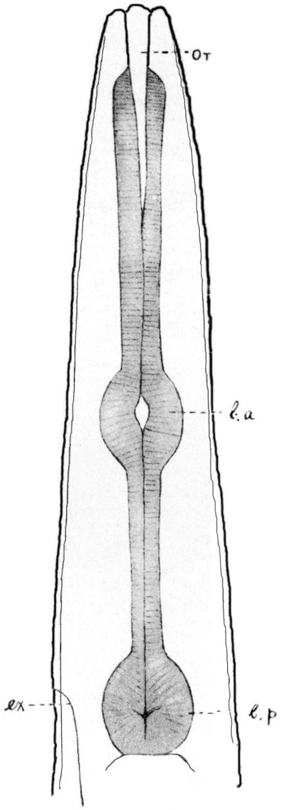


Fig. 5

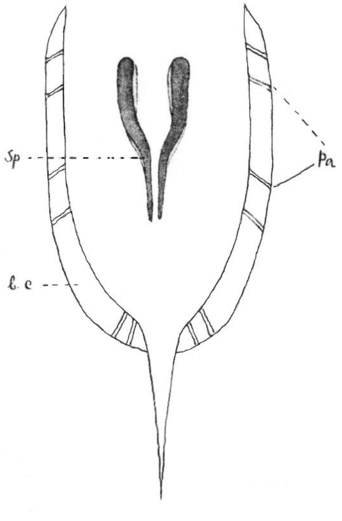
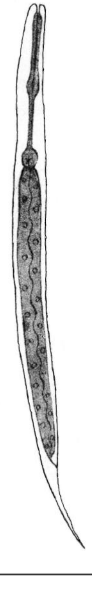


Fig. 6



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EXPLANATION OF PLATE XIII

Fig. 1.—Young female. × ca. 100.

Fig. 2.—Full grown female. × ca. 100.

Fig. 3.—Ditto; the oesophagus. × ca. 50.

Fig. 4.—Full grown male. × ca. 100.

Fig. 5.—Ditto; the posterior end. × ca. 500.

Fig. 6.—Larva. × ca. 300.

REFERENCE LETTERS

a, annus; *ba,* anterior bulbus; *bp,* posterior bulbus; *bc,* bursa copulatrix; *ex,* terminal part of the excretory duct; *int,* intestine; *oes,* esophagus; *ov a,* anterior ovary; *ov p,* posterior ovary; *or,* oral cavity; *sp,* spicule; *t,* testis; *vlv,* vulva; *u,* uterus.